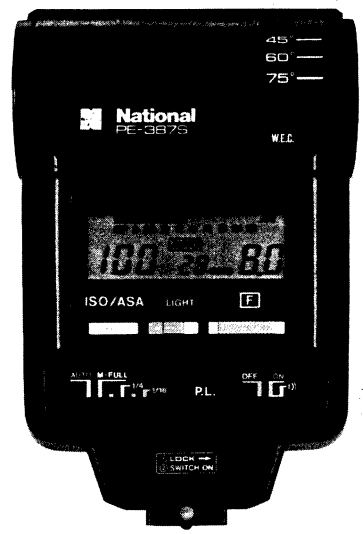
ORDER NO.PAD-8205008C

Service Manual

FLASH UNIT

PE-387S



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■ SPECIFICATIONS

● Guide number (ISO/ASA100)

Power control / Lens coverage indicator	Full	■(1/2)	1/4	■(1/8)	1/16
*20mm	16	11	8.0	5.5	4.0
28mm	27	19	13	9.5	6.7
35mm	32	22	16	11	8.0
50mm	38	26	19	13	9.5
85mm	42	29	21	14	10

* When using the optional 20mm wide-angle diffuser.

● Flash duration (approx.):

Auto	Manual				
	Full	■(1/2)	1/4	■(1/8)	1/16
1/30,000~1/1,000sec.	1/1,000sec.	1/1,250sec.	1/2,500sec.	1/5,000sec.	1/12,500sec.

● Automatic operating range (ISO/ASA100)

Lens coverage indicator / Automatic F-stop	*20mm	28mm	35mm	50mm	85mm
F1.4	2.0~11 m	3.0~19 m	4.0~22 m	4.0~27 m	6.0~30 m
F2.0	1.5~8.0m	2.0~13 m	3.0~16 m	3.0~19 m	4.0~21 m
F2.8	1.0~5.7m	1.5~9.6m	2.0~11 m	2.0~13 m	3.0~15 m
F4.0	0.7~4.0m	1.0~6.7m	1.5~8.0m	1.5~9.5m	2.0~10 m
F5.6	0.7~2.8m	0.7~4.8m	1.0~5.7m	1.0~6.7m	1.5~7.5m
F8.0	0.7~2.0m	0.7~3.3m	0.7~4.0m	0.7~4.7m	1.0~5.2m
F11	0.7~1.4m	0.7~2.4m	0.7~2.9m	0.7~3.4m	0.7~3.8m
F16	0.7~1.0m	0.7~1.6m	0.7~2.0m	0.7~2.3m	0.7~2.6m

* When using the optional 20mm wide-angle diffuser.

● Sensor measuring angle (approx.): 20°

● Recycling time (approx.):

Powser source	Auto	Manual				
		Full	■(1/2)	1/4	■(1/8)	1/16
Four 1.5V size AA Alkaline batteries	0.2~11sec.	11sec.	7sec.	5sec.	3sec.	1sec.
Four size AA Ni-Cd batteries	0.2~7sec.	7sec.	5sec.	3.5sec.	2sec.	0.3sec.

● Number of flashes (approx.):

Power source	Auto	Manual (Full)
Four 1.5V size AA Alkaline batteries	100~650	100
Four size AA Ni-Cd batteries	50~300	50

● Angle of coverage and GN

Lens coverage indicator	Angle of coverage (with 35mm camera)	Guide number	
		ISO/ASA100	ISO/ASA400
*20mm	20mm lens cover (Vertical:69°, Horizontal:87°)	16	32
28mm	28mm lens cover (Vertical:53°, Horizontal:70°)	27	54
35mm	35mm lens cover (Vertical:45°, Horizontal:60°)	32	64
50mm	50mm lens cover (Vertical:34°, Horizontal:46°)	38	76
85mm	85mm lens cover (Vertical:23°, Horizontal:31°)	42	84

*When using the optional 20mm wide-angle diffuser.

● Bounce angle:
Vertical: 0°~90° (click stop at 0°, 45°, 60°, 75° and 90°)
Horizontal: 90°~0°~90° (click stop at 0°, 45°, 60°, 75° and 90°)

● Power sources:
Four 1.5V size AA Alkaline batteries or Ni-Cd batteries

● Color temperature:
Ideal for color or black & white film

● Size and weight:
106mm(H)×79mm(W)×95mm(D), 380g(without batteries)

● Flash unit set: Model 387S, Synchro cord

● Optional accessories:
3m synchro cord(PP-SC30A), Remote sensor Type 2(PW-12S), 20mm wide-angle diffuser(PP-WP20G), Macro flash sensor Type 1 (PW-50M), Charging set (PW-1103).

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I. Disassembly and Reassembly Instructions

Disassembly

1. Remove three screws (28, 30) of the shoe.
2. Remove two screws (26) on the body case LB (6), and separate body case LA (5) from body case LB.

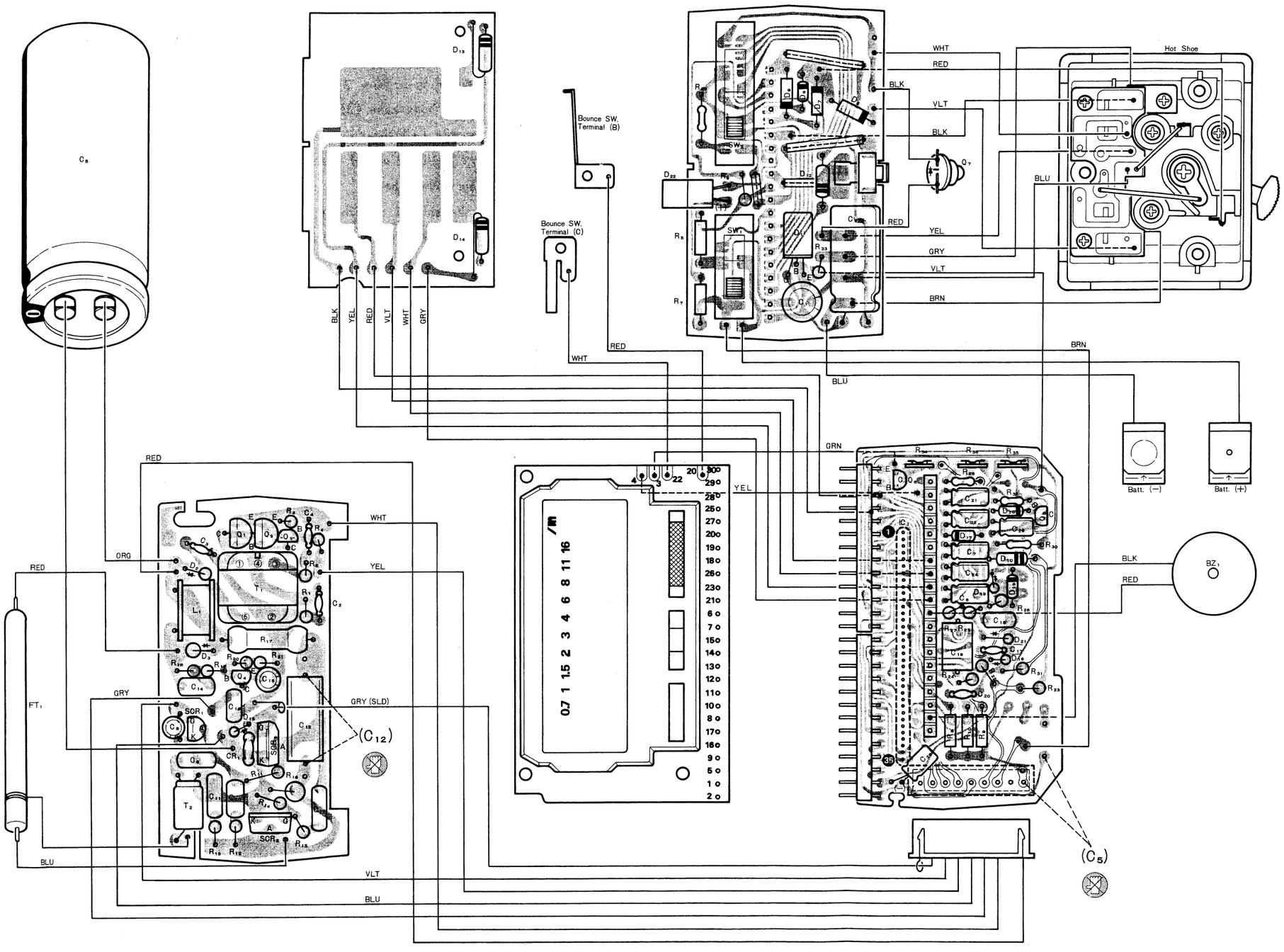
   Note: As the main capacitor (C_5) and the MD capacitor (C_{12}) stores high voltage, it is vital to discharge these capacitors carefully using a soldering iron or other tool. (Discharge Point is shown in section 2, "Circuit Board and Wiring Connection.")
3. Separate the bounce head from body case LB by bouncing it to right (90°) and pull up.
4. Remove two screws (26) on the LCD board.
   PC board unit (50) can now be lifted out of case.
5. Pull out hood case (7) from bounce head.
6. Remove side plate (17) at the side of main body.
7. Remove four screws (31) at the side of body case UA (1) and remove two screws (29) on the body case UB (2).
8. Separate body case UA from body case UB.
9. Remove two screws at the bottom of body case CB (4), and separate body case CB from body case CA (3).

Reassembly

1. Join body case CB to body case CA, and tighten two screws.
2. Set the reflector (38), diffuser (39) and PC board C (51) on the body case UB.
3. After setting the click stopper (18) and spring (19) on the body case UA, join it to body case UB and tighten six screws.
4. Set the switch plate (16) and switch knobs (40) on the body case LB.
5. Insert the PC board unit to the body case LB and fix it with two screws.
6. Set the bounce head to the body case LB by reversing the disassembly procedure.
7. Set the buzzer (BZ_1) and battery compartment lid (36) to the body case LB.
8. Join body case LA to body case LB, and tighten two screws.
9. Set the shoe case and fix it with three screws.
10. Stick the side plates, and set the hood case.

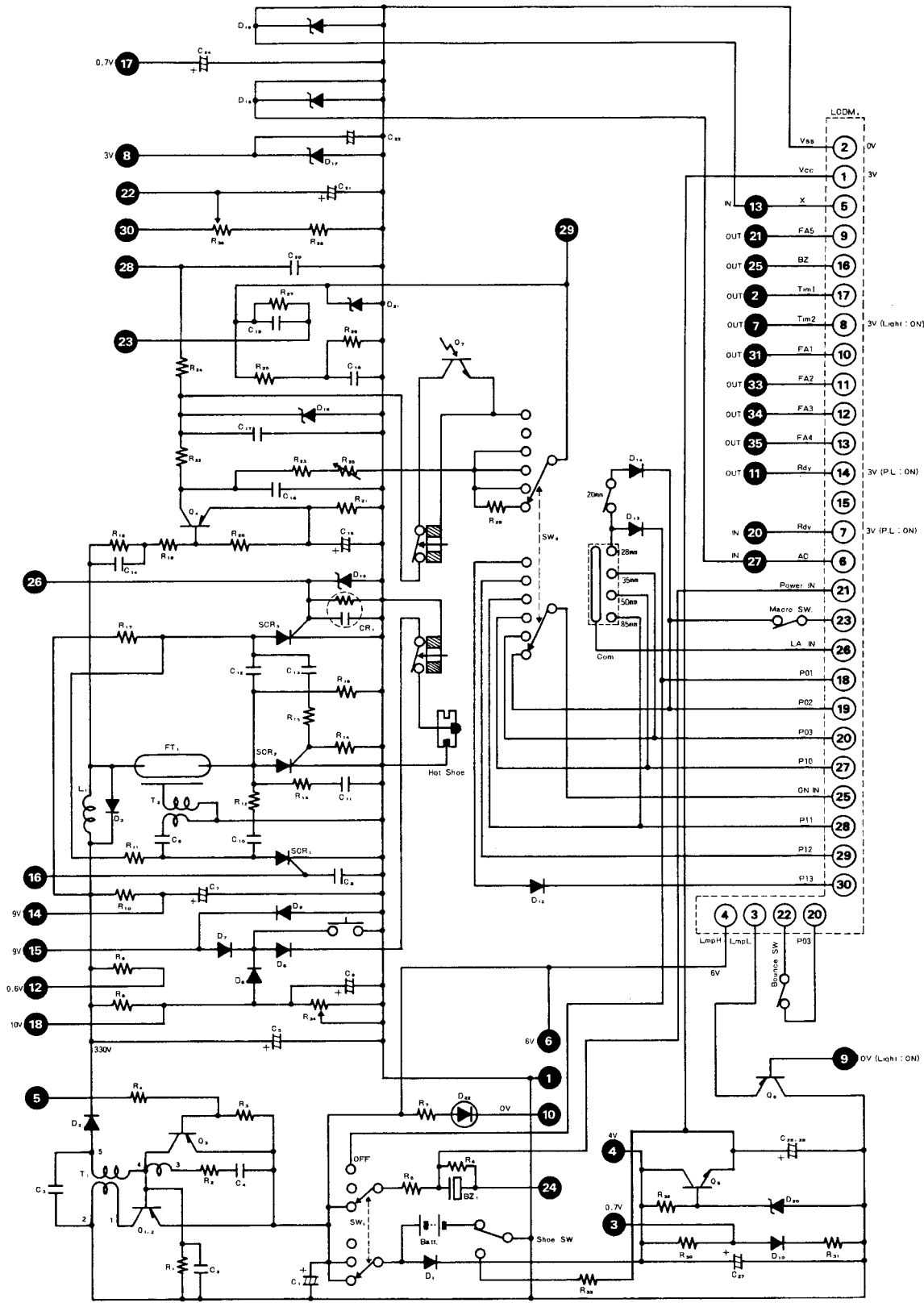
2. Circuit Board and Wiring Connection

⊗ : Discharge Point



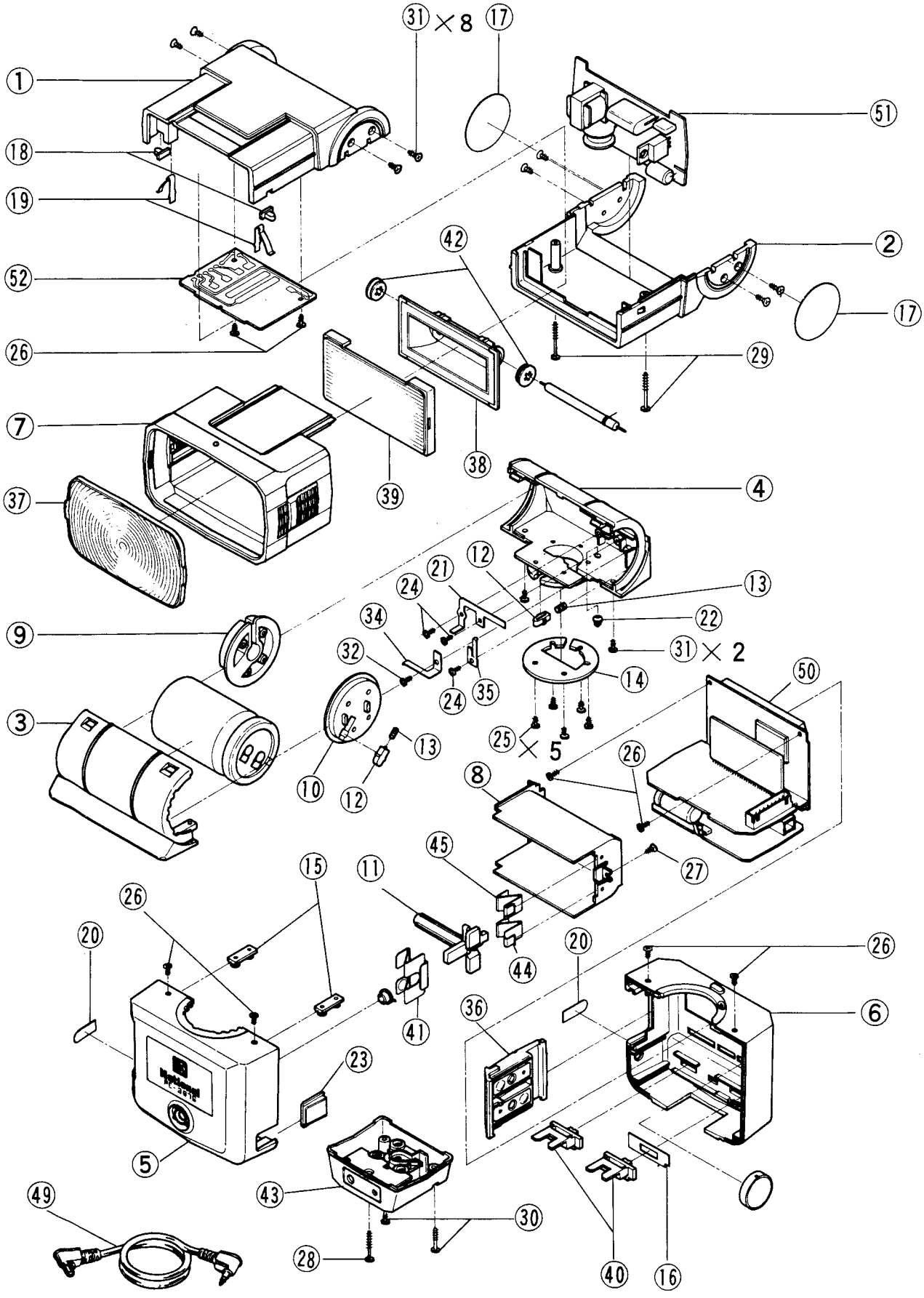
R_1	8.2KΩ¼W
$R_{2,13}$	100Ω¼W
R_3	100KΩ¼W
R_4	4.7KΩ¼W
R_5	330Ω¼W
$R_{6,15}$	1 KΩ¼W
R_7	680Ω¼W
R_8	2.2MΩ¼W
R_9	3.3MΩ¼W
$R_{10,11,18}$	1.2MΩ¼W
R_{12}	33Ω¼W
R_{14}	22Ω¼W
R_{16}	8.2KΩ 1 W
R_{17}	15KΩ 2 W
R_{19}	33KΩ¼W
R_{20}	10KΩ¼W
R_{21}	180KΩ¼W
$R_{22,24}$	220Ω¼W
R_{23}	22KΩ¼W
R_{25}	68Ω¼W
R_{26}	470KΩ¼W
R_{27}	47KΩ¼W
R_{28}	56KΩ⅛W
R_{29}	18KΩ⅛W
R_{30}	7 KΩ¼W1%
R_{31}	1 KΩ¼W1%
R_{32}	1 KΩ⅛W
R_{33}	10Ω¼W
$R_{34,36}$	100KΩ VR
R_{35}	50KΩ VR
C_1	220μF6.3
$C_{2,4}$	0.1μF12
C_3	100PF500
C_5	1100μF350
$C_{6,7,24}$	1μF16
$C_{8,17,20}$	0.05μF12
$C_{9,13}$	0.047μF350
$C_{10,14}$	0.03μF400
C_{11}	0.068μF350
C_{12}	3.3μF350
C_{15}	4.7μF50
C_{16}	0.047μF50
C_{18}	0.056μF50
C_{19}	1μF50
C_{21}	3.3μF50
$C_{22,28,29}$	10μF16
C_{27}	1000μF6.3
CR_1	680Ω/3300PF
D_1	MA-23B
D_2	S1R-150
$D_{3,8}$	10D-8
D_6	MA-150
$D_{7,9}$	10D-1
$D_{13,14}^{10,12}$	20A99
$D_{15,21}$	MZ-303
D_{16}	MZ-306
D_{17}	RD3.3EB1
$D_{18,19}$	MZ-304
D_{20}	RD4.7EB1
D_{22}	LN217RP
$Q_{1,2}$	2SB873
$Q_{3,4,6}$	2SA1115
Q_5	2SC2603
Q_7	PN-123S
SCR_1	CR02AM-8
SCR_2	CR3JM-8
SCR_3	CR3CM-8
IC_1	MA7424-01
T_1	1630
T_2	SN-900
L_1	272L_1
$LCDM_1$	IM-902
FT_1	D-311FL
BZ_1	PKM35-4AO
SW_1	SKM-24-045P
SW_2	SLBN-26MP-045

3. Schematic Diagram



Notes: 1. The white letters in this schematics indicate the terminal number of IC_1.
2. DC voltage measurements are taken with circuit tester 20KΩ/V from (−) terminal of battery. (Input voltage: 6v, SW_1: 🔊 , SW_2: M·FULL)

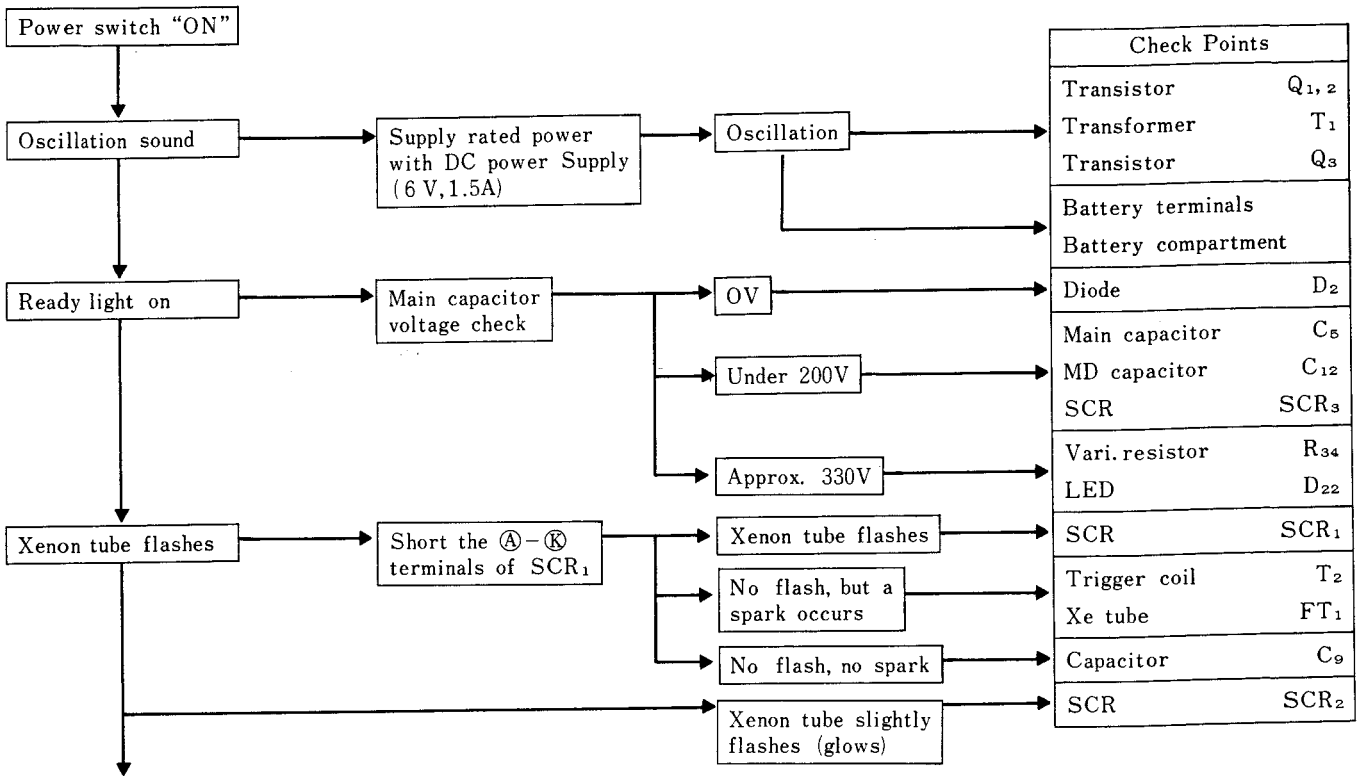
4. Exploded View



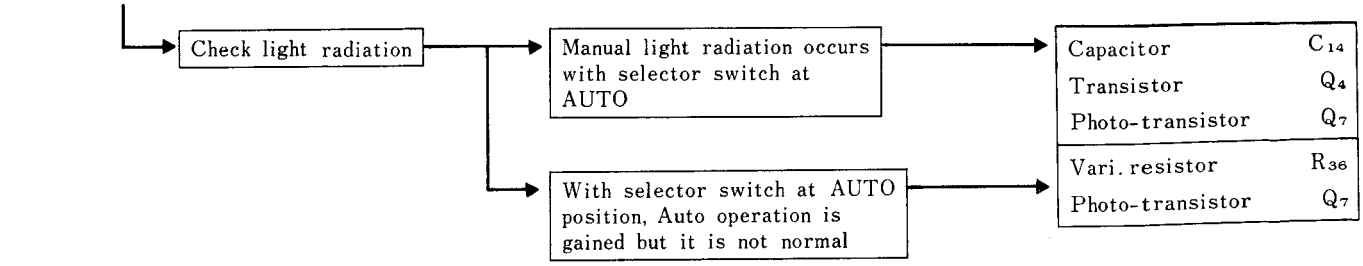
5. Trouble Shooting Guide

Check the flash unit with fresh batteries loaded, in the following manner:

〔Ⅰ〕 Difficulty in MANUAL operation.



〔Ⅱ〕 Difficulty in AUTO operation.



〔Ⅲ〕 Difficulty of LCD display

DISPLAY	HOW TO CHECK	CAUSE
The display is not "ASA100 F 8 " by turning on the power.	Turn the shoe lock lever "ON" and "OFF" several times.	Shoe (Terminal for defective contact)
	Check battery voltage:less than 4V	Batteries too weak
The display is not turned out by turning off the power.		Defective LCD module
Range/distance indication is unstable.	Bounce the head vertically or horizontally.	Defective contact of bounce terminals
Lens coverage indication is unstable:error indication (---) at 85mm posisiton.	Check hood case setting.	Defective contact of wide SW. terminals.
Lens coverage indication is unstable: "20mm"indicates at 28mm position.	Check wide switch on the hood case.	Defective contact of wide SW. terminals.

When inserting the macro flash sensor, f-stop does not indicate the f-stop which is closed down four steps.	Check switch action of macro switch on the PC board unit.	PC board is inserted to the incorrect position. Lead wires to the senser are pinced by switch terminals.
When not inserting the macro flash sensor, f-stop indicates the f-stop which is closed down four steps.		Defective contact of macro SW. terminals.
LCD display is not illuminated by pressing the light key	Check voltage of IC_1:No. 7 terminal (See Section 3) ---Normal level	Defective Q_6 Defective IC_1
	---Abnormal level	Defective LCD module

6. Adjustment

1. Adjustment of the Voltage for Pilot Lamp Lighting

(1) Supplies Required

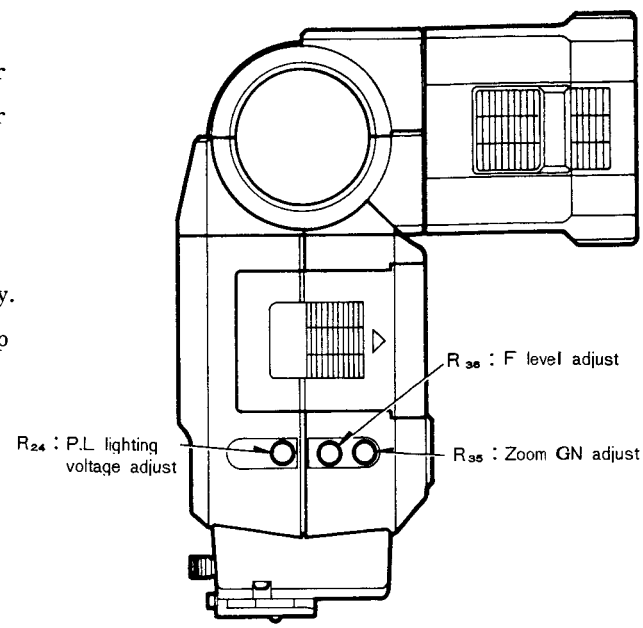
- Regulated D.C power supply
- Insulated driver
- Disital tester or D.C volt meter
- Battery adaptor

(2) How to Adjust

1. Remove the shoe case and the body case LA. (See Section 1)
2. Supply rated power (6 V,1.5A) with D.C power supply.
3. Turn the variable resistor (R_{34}) so that the pilot lamp is lighted when the valtage across main capacitor (C_5) reaches the following potential.

   The Voltage for P.L Lighting : 265V±5V

Fig-I



Notes:

1. Whenever the variable resistor is turned, the insulated driver should be used.
2. It should be confirmed that the P.L is lighted at 260V to 270V after adjusting.
3. It is impossible to adjust the variable resistor when the voltage is increased too rapid to confirm the P.L lighting. In this case, if the output voltage of D.C power supply is set to a little less than the voltage related above (6 V), it will become more easy to adjust.

2. Adjustment of Automatic F-stop Settings

(1) Supplies Required

- Flash light volume meter
- Regulated D.C power supply or fresh batteries
- Reflection paper
- Battery adaptor
- Synchro cord
- Insulated driver
- Fixed stand for flash unit

(2) How to Adjust

1. Install the Flash light volume meter and the Flash unit to be adjusted, opposite to the reflection paper and connect the instruments.
2. Set the display of the flash unit to "AUTO F : 8.0 28mm ASA100," and press the light measuring button after passing more than 30seconds from the point of P.L lighting
3. Turn the variable resistor (R_{36}) so that the needle of the Flash light volume meter can meter can be read within the provided value.

   Provided F-stop value : F8.0±0.3EV (F7.2~F9.0)
4. After adjusting, change the F-stop indication in order and confirm that the needle of Flash light volume meter can be read within the allowable range.

Automatic F-stop settings of the F-stop indicator	Standard F-stop value	Allowable range for the scale of Flash light volume meter
F2.0	F2.0± 1 EV	F1.4~F2.8
F2.8	F2.8± 1 EV	F2.0~F4.0
F4.0	F4.0± 1 EV	F2.8~F5.6
F5.6	F5.6± 1 EV	F4.0~F8.0
F8.0	F8.0± 1 EV	F5.6~F11
F11	F11 ± 1 EV	F8.0~F16

Notes:

4. Keep pressing the light measuring button of Flash light volume meter, while mea measuring.

3. Adjustment of Zoom G.N Settings

(1) Supplies Required

Same supplies as related before

(2) How to Adjust

1. Install these instruments as related in Adjustment of Automatic F-stop Settings.
2. Sett the auto/manual selector switch to "MANUAL·1/16" position, and press the light measuring button after passing more than 30 seconds from the point of P.L lighting. (The display is "M F8.0 28mm ASA100")
3. Turn the variable resistor (R_{35}) so that the needle of the Flash light volume meter can be read within the provided value.

   Provided G.N value: G.N6.7(F3.35)±0.5EV (F2.8~F4.0)
4. After adjusting, change the A/M selector switch in order and confirm that the needle of Flash light volume meter can be read within the allowable range.

Zoom settings of the Flash unit to be adjusted	Standard F-stop value (at 2meters)	Allowable range for the scale of Flash light volume meter
1/16 (G.N6.7)	F3.35± 1 EV	F2.4~F4.8
1/8 (G.N9.5)	F4.75± 1 EV	F3.4~F6.7
1/4 (G.N13)	F6.5 ± 1 EV	F4.6~F9.2
1/2 (G.N19)	F9.5 ± 1 EV	F6.7~F13

7. Checking After Repairs

Check the flash unit with fresh batteries loaded and synchro-cord connected, in the following manner :

1. Switch action

- Double check ON-OFF battery switch

  Lock the shoe lock lever and turn the power switch "ON" and "OFF" three times, and check to see if the unit is activated and stopped accordingly.

- Flash stop device

  After the P.L lighting, turn off the shoe lock lever and/or power switch, and check to see if the P.L and the LCD display turn off.

- Memory circuitry

  Turn the power switch to "OFF" and "ON," and check if the memory circuit restores the previous informations on the LCD display by pressing any of three keys, when the shoe lock lever remains locked.

2. LCD display

Check if the LCD display of the flash unit is fulfilled the items shown below.

ITEM	OPERATION	LCD DISPLAY
Initial display	Turn on the power.	ASA100 F8.0 (Other indications are depend on each setting position)
F-stop	Press the F-stop key	F1.4 to F16 in 8 steps (at ASA100)
Film speed (ISO/ASA)	Press the film speed key.	ASA25 to ASA800 in 16 steps
Lens coverage	Extend or retract the angle zoom flash head.	In conjunction with the angle zoom setting, the camena focal length which can be covered is displayed. (If the angle zoom flash head is not properly positioned at a click stop, the LCD displays the error indication "---".)
Auto/manual mode	Set the A/M selector switch.	Code addres Auto : AUTO Manual : M
Range/distance		◀;■;▶ In accordance with the film speed, F-stop and/or lens coverage settings, the automatic operating range/flash-to-subject distance in manual is displayed.

ITEM	OPERATION	LCD DISPLAY
Macro	Mount the optional macro flash sensor (PW-50M)	The f-stop on the LCD panel will indicate the f-stop which is closed down 4 steps.
Light	Press the light key.	LCD panel is illuminated, and it will be turned out automatically after approx. 20 seconds.
Auto check	Flash the unit at AUTO.	The auto mode indicator "AUTO" blink 4 times
Automatic energy saving system	Don't fire the flash and power remains on without any operation for approx. 5 minutes.	After blinking the LCD display and P.L for approx. 10 seconds, the LCD indicates "OFF." (Press any of three keys and the memory circuit restores the previous informations on the LCD panel.)

3. Flashing

Turn the power on. (A/M selector switch: M·FULL)

When the P.L lights up, let the unit flash with the synchro-cord, and when the P.L lights up the next time, let it flash again by the open flash button.

Count the time before P.L lights up again.

If it is approx. 11 seconds, the unit is normal. (With Alkaline batteries)

4. Sound monitor system

With the power switch set to the beeper mark "))) ," check the items shown below.

- Completion of charging

  When the P.L lights up, the beeper should sound intermittently pi, pi, pi, --- in auto mode or pipi, pipi, pipi, --- in manual mode.

- Auto check

  If light is adequate for correct exposure, the continuous beep sound occurs for approx. 2 seconds, accompanied by the blinking of auto mode indication "AUTO."

- Warning of automatic energy saving system

  To warn that charging is automatically stopped, the intermittent beep sound occurs for approx. 10 seconds, accompanied by the blinking of LCD panel and P.L.

5. Adjustment and measurement of automatic F-stop and zoom G.N settings

Let the unit flash at 2 meters at an interval of 30 seconds according to the operating instructions of Flash light volume meter.

Adjust the light output so that the specified F-stop and G.N is fulfilled.

If it is in the allowable range, the unit is normal.

6. Automatic energy saving system

If you do not fire the flash and power remains on without any operation for approx. 5 minutes the charging cycle should automatically stop to conserve battery life.

But the normal recycling cycle should start by pressing any of three keys.

Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks	I.G.P.Qt'y
D_6		SC 005−48	Diode MA-150	1		5
$D_{7,9}$		SC 005−04	Diode 10D-1	2		5
$D_{13,14}^{10,12}$		SC 005−59	Diode 20A99	4	○	5
$D_{15,21}$		SC 006−26	Diode zener MZ-303	2		5
D_{16}		SC 006−11	Diode, zener MZ-306	1		5
D_{17}		SC 006−29	Diode, zener RD3.3EB1	1	○	5
$D_{18,19}$		SC 006−24	Diode, zener MZ-304	2		5
D_{20}		SC 006−30	Diode, zener RD4.7EB 1	1	○	5
D_{22}		SC 025−40	LED LN217RP	1	○	5
			TRANSISTOR, SCR & IC			
$Q_{1,2}$		SC 003−66	Transistor 2 SB873	2		10
$Q_{3,4,6}$		SC 003−49	Transistor 2 SA1115	3		10
Q_5		SC 003−50	Transistor 2 SC2603	1		10
Q_7		SS 512−09	Photo-transistor PN-123S	1		5
SCR_1		SC 023−04	SCR CR02AM-8	1		5
SCR_2		SC 023−31	SCR CR3JM-8	1		5
SCR_3		SC 023−32	SCR CR3CM-8	1		5
IC_1		SS 514−47	IC MA7424-01	1	○	5
			TRANSFORMER, COIL & INDUCTOR			
T_1		SS 506−84	Transformer, OSC 1630	1		5
T_2		SS 508−32	Coil, trigger SN-900	1		5
L_1		SS 021−10	Inductor 272L_1	1		1
			TUBE, BUZZER & SWITCH			
FT_1		SS 500−76	Tube, xenon D-311FL	1	○	10
BZ_1		SS 518−10	Buzzer PKM35-4A 0	1	○	5
SW_1		SC 300−46	Switch, slide SKM-24-045P	1		5
SW_2		SC 300−67	Switch, slide SLBN-26MP-045	1	○	5
			ASSEMBLIES			
50		SS 305−44	Printed circuit board unit	1	○	1
51		SS 303−06	Printed circuit board (C) assembly	1	○	1
52		SS 303−07	Printed circuit board (D) assembly	1	○	1

Notes: The printed circuit board assemblies of Ref. No.50,51 and 52 will be supplied till the day, three months before discontinuation date of production of the flash unit Model PE-387S.

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